

Biological Sciences

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VIEW FROM THE DEPARTMENT: *UNDERGRADUATE RESEARCH*



For undergraduate students, one of the distinct advantages of attending a research-intensive university is the opportunity to get involved with research. Research experiences significantly improve critical thinking skills and build a deep understanding of how science works. Some of the lessons learned include the importance of teamwork; the need to relate work to peer-reviewed literature; and the value of using chemistry, physics, mathematics, and communication skills to solve biological problems and report results.

The progression of undergraduate research experiences begins with basic tasks such as washing glassware, mixing reagents, weighing samples, running a centrifuge, using a variety of sophisticated or complex instruments, recording data, avoiding poison ivy, and doing simple statistical analyses of experimental results. Later on, students learn how to read and analyze a publication, express their own opinions, troubleshoot complex equipment, use sophisticated techniques to create standard curves, and design appropriate controls for an experiment. Finally, with guidance from a faculty mentor, students tackle a complete research project using all of the key elements in the scientific method; i.e., they 1) explore patterns in data or the literature, 2) propose a hypothesis to explain the patterns, 3) design an experiment to test the hypothesis, 4) conduct the experiment, and 5) evaluate the results in light of the hypothesis.

Most graduate programs and professional schools and many companies look for research experience when selecting students for training or employment. Consequently, we strongly encourage our students to seek opportunities for research. About 50% of them take our advice. Research opportunities are highly competitive; therefore, students need to take significant personal responsibility to get engaged.

Undergraduate research projects are also relatively expensive. The department is providing some help to offset costs. We have sought financial support through a new corporate partnership program (VT BioSPIRE, see page 6) to increase opportunity. In addition, many of our faculty actively seek federal research grant support that is targeted toward undergraduate research. Finally, to coordinate efforts, enhance the quality of our programs, and assure accountability, we recently created an undergraduate research faculty committee. The committee just launched a new competitive grants program, funded by private giving to the department.

Undergraduate research is a powerful learning tool. We predict that it will grow in importance as universities evolve, and provide ever-increasing value for educational programs at Virginia Tech.

Sincerely,

Robert H. Jones
Department Head

This newsletter was created by Valerie Sutherland, Program Support Technician for the Department of Biological Sciences, and Hiba Mustafa, a Senior in Biological Sciences. We welcome comments and items of interest for future newsletters. Please contact Dr. Robert Jones, Biological Sciences 0406, Virginia Tech, Blacksburg, VA 24061. You may also send an email to Valerie Sutherland (vsutherl@vt.edu) or Robert Jones (rhjones@vt.edu).

RESEARCH HIGHLIGHTS

The Relationship Between Stress and Disease in Wildlife

Most of us are intimately familiar with the immunosuppressive effects of chronic stress. One need only recall that dreadful flu acquired in the middle of final exams to understand how external stressors can influence underlying resistance to infectious diseases. Wildlife experience similar dynamic changes in immune susceptibility, and these changes have important implications for both wildlife and human health. **Dr. Dana Hawley**, Assistant Professor of Biological Sciences, is researching the types of stressors that compromise health in wildlife, including social stress, habitat disturbance, and pollutants.

Why does variation in wildlife health matter? Infectious diseases of wildlife are emerging in parallel with those in humans. In fact, the majority of emerging diseases in humans are zoonotic, meaning they are transmitted from animals to humans. Zoonotic diseases affecting humans around the world and close to home include SARS, West Nile Virus, Lyme Disease, and Avian Influenza. Although significant progress has been made in controlling or treating some of these devastating diseases after they affect human health, an overlooked and often more cost-effective form of control breaks the transmission cycle of zoonotic disease in wildlife populations. This type of control relies on detailed knowledge of wildlife disease ecology such as when wildlife diseases peak in prevalence, and why. When wildlife disease is most common, spillover into human populations becomes likely. Dr. Hawley's laboratory studies the factors that mediate susceptibility to disease epidemics in wildlife across space and time. Ultimately, this type of information will help inform wildlife health and conservation efforts as well as human public health programs targeting zoonotic disease.

Dr. Hawley's primary study system is a recently emerged disease of wild songbirds, Mycoplasmal conjunctivitis, which most commonly infects a common visitor to backyard feeders-- the house finch (*Carpodacus mexicanus*). This devastating eye disease is caused by a bacterium, *Mycoplasma gallisepticum*, which historically infected only poultry species until a unique genetic strain jumped into house finches in the mid-1990s. Epidemics of conjunctivitis in house finches resulted in up to 60% population reductions and continues to cause annual winter epidemics today. Many directly transmitted human diseases such as influenza show seasonal patterns similar to Mycoplasmal conjunctivitis, where infection rates peak during winter but otherwise remain low. The mechanisms underlying seasonal flu patterns in humans are still a mystery, but may relate to school attendance patterns or altered immune susceptibility during winter. In wildlife such as wintering house finches, disease rates may peak in winter because competition for food is at its greatest, birds often live in large groups at that time, and the energetic costs of thermoregulation are high.

Although house finch flocks cooperate to find food, competition for limited resources replaces cooperation once food is located. Socially dominant birds readily displace subordinate flockmates from feeders, creating a hierarchy of food access commonly referred to as a "pecking order". The aggressive interactions involved in this process are stressful: when Dr. Hawley manipulated the extent to which house finches had to fight to obtain food, birds living amongst heated competition had significantly compromised immune responses. Each individual's place in the hierarchy was equally important-- in most cases, dominant finches mounted the strongest immune responses,



House Finch (*Carpodacus mexicanus*)

likely because they obtained sufficient food to stay in good condition. However, when flock membership changes and the established "pecking order" is threatened, dominant birds become more aggressive in order to maintain their status: in this case, they become more immune-compromised than their subordinate flockmates. Dr. Hawley is interested in how these socially enforced sources of variation in immunity might help some infectious diseases persist year to year. House finch pecking orders and other forms of social hierarchies among group-living animals may help to maintain susceptible individuals in a population over longer time spans -- a trait that prevents a pathogen epidemic from "fizzling" out of a population.

The impacts of stressors on disease will vary significantly with the mode of pathogen transmission. A new project in Dr. Hawley's laboratory is focusing on the impact of habitat disturbance on vector-borne diseases such as West Nile Virus, Lyme Disease, and avian malaria. Dr. Hawley's research group is using experimentally disturbed forest plots as well as undisturbed forest to examine differences in vector communities such as mosquitoes and ticks, as well as reservoir (e.g. bird and mammal) communities. Preliminary data indicate that forest disturbance such as logging affects both vector and host communities, and likely disease dynamics. This study will help us to understand the mechanisms that drive variation in risk from diseases such as West Nile Virus across the landscape, and will allow more focused control efforts as a result.

Article by Dr. Dana Hawley. For more information on her research, visit <http://www.biol.vt.edu/faculty/hawley/index.html>.

Our Department is pleased to welcome its two newest family members! Chiara Sofia, daughter of Carla Finkielstein (Assistant Professor of Biological Sciences) and Daniel Cappelluto (Assistant Professor of Cell Biology), was born June 16th; and Raegan Elaine, daughter of Vanessa Law (Fiscal Technician) and husband Daren, was born August 3rd.

RESEARCH HIGHLIGHTS

Key protein molecule linked to diverse human chronic inflammatory diseases

By Susan Trulove, University Relations

Dr. Liwu Li, Associate Professor of Biological Sciences at Virginia Tech, has revealed a common connection between the cellular innate immunity network and human chronic inflammatory diseases, including atherosclerosis, Type 2 Diabetes, and neurodegenerative diseases. The finding presents a viable cellular and molecular target for the diagnosis and treatment of serious human inflammatory diseases, according to Li.

“Researchers and physicians have long recognized that there is an association between these conditions. For example, obesity increases the risk of heart attack or stroke, Type 2 Diabetes or insulin resistance, and Alzheimer’s Disease,” said Li, who is the founding director of the Inflammation Center at Virginia Tech.

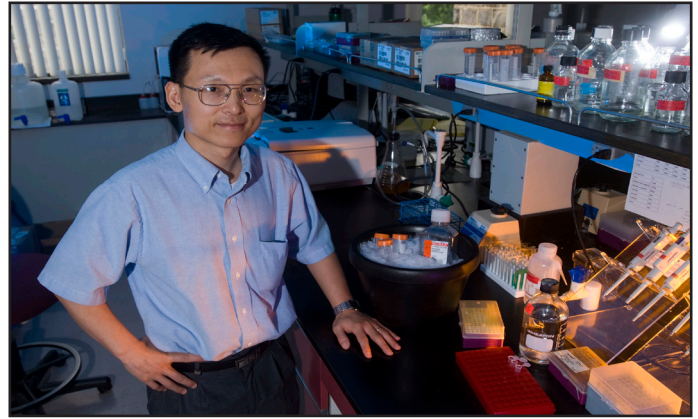
“Inflammation is the common mechanism,” he said. “Inflammation is a double-edged sword. Proper inflammation is necessary to fend off infection and abnormal cell growth. On the other hand, excessive inflammation contributes to diverse chronic diseases, including atherosclerosis, diabetes, and lupus.” However, the complex cellular and molecular networks controlling inflammation are still poorly understood, he said. “The lack of understanding impedes our progress in treating serious chronic inflammatory diseases.”

In a series of studies published throughout the last decade*, Li’s group has defined several critical signaling networks essential for the modulation of inflammation. In particular, a key cellular protein kinase named interleukin-1 receptor associated kinase 1 (IRAK-1) was shown to be critical for processing diverse inflammatory signals, including microbial products, cytokines, and insulin. Li’s group discovered that excessive IRAK-1 activation is linked with the risk of atherosclerosis and diabetes. Using transgenic mice without the IRAK-1 gene, Li’s group demonstrated that IRAK-1 deficient mice are protected from developing atherosclerosis and insulin resistance.

At the molecular level, Li’s laboratory discovered that IRAK-1 prefers to phosphorylate transcription factors harboring the Serine-Proline motif including STAT-3 and NFAT. Subsequently, STAT-3 and NFAT are involved in modulating the expression of distinct inflammatory mediators responsible for the excessive activation of specialized macrophages and T cells. These cells eventually contribute to diverse inflammatory symptoms including cardiovascular diseases, diabetes, Alzheimer’s diseases, and lupus. “Chemical compounds targeting this molecule will have enormous therapeutic potential,” Li said.

“There is still a long way to go for finding the actual cure for these diseases,” he said. “That is why we are combining expertise from various disciplines, including experimental biology and computational simulation. The Inflammation Center integrates faculties with expertise in experimental molecular biology, cutting edge imaging of inflamed cells and tissues, computational simulation of cellular signaling networks, human and animal studies, and nano-technologies designing novel intervention.”

Virginia Tech Intellectual Properties Inc. (VTIP) filed a patent application for Li’s discovery and its use as a diagnostic tool and treatment strategy. “This technology will still take some time before there is a product,” said Li.



“But it is an important piece of intellectual property that will benefit from the increased emphasis on human health that is taking place at Virginia Tech now through the Virginia Tech Carilion Medical Research Institute and its partnerships with physicians,” said Jackie Reed, licensing associate with Virginia Tech Intellectual Properties.

Li also points out that the medical students from the new medical school will benefit from his research. In turn, he will have the opportunity to gain clinical samples from physicians at Carilion. “The goals of translating basic findings into future therapies will be reached more easily through our collaborations with clinical physicians,” said Li.

“The Virginia Tech-Carilion partnership in the medical school is going to accelerate the translational research process -- moving important basic science research to the bedside,” said Reed.

Li’s research is funded by major research grants from the National Institutes of Health.

Inflammation is one of four initial research areas for the Virginia Tech Carilion Medical Research Institute. The others are cardiovascular science and cardiology, neuroscience, and infectious disease. The medical research institute, managed by Virginia Tech, is a collaboration with the Carilion Clinic and the newly established Virginia Tech Carilion School of Medicine, a private independent school jointly managed by Virginia Tech and Carilion, all co-located on a new campus under construction in Roanoke.

*The most recent publication from Li’s group appeared in the September 2008 issue of *Molecular Immunology*, “The interleukin-1 receptor associated kinase 1 contributes to the regulation of NFAT,” by Dongmei Wang, Stephan Fasciano, Liwu Li (available online Aug. 8, 2008), pages 3902-3908.

For more information on Dr. Li’s research, visit his website at <http://www.biol.vt.edu/faculty/li>.

In remembrance of the Biological Sciences, Psychology and English triple-major, the **Ryan Clark Scholarship and Community Service Award** has been established. Eligible recipients are students ages 14-19 in Richmond and Columbia Counties in Georgia who have demonstrated a strong commitment to volunteering in their communities. Donations to the fund may be made by contacting Connie Redmond, Assistant Vice President and Branch Manager, of the Security Federal Bank, 7004 Evans Town Center Blvd., Evans, GA 30809, or by phone at (706) 650-6790.

FACULTY AND STAFF NEWS



MEASURE OF RESPECT

Robert A. Paterson [Jan 23, 1926 – May 13, 2008] was born in Reno, Nevada and received his early education in the Reno public school system. During World War II, Bob served in the U.S. Navy. After a B.A. in Biology (1949) from the University of Nevada, an M.A. in Biological Sciences from Stanford (1952), and Ph.D. in Botany from the University of Michigan (1957), Bob served as Assistant and Associate Professor of Botany at the University of Maryland (1957-67). Most of us got to know Bob Paterson far better in his next job.

In 1967, Bob came to Virginia Tech as Professor and Biology Department Head. Over a span of just 12 years (1967-79), he hired about 30 new faculty, many of whom remain near the Tech campus today. Until his retirement in 1994, Bob served in many capacities as administrator and teacher. These included Associate Dean for Administration, Associate Dean for Research and Graduate Studies, Interim Dean for the College of Arts & Sciences, Director of the Center for the Study of Science & Society, and the Science and Technology Studies Graduate Program. Many of us knew Bob as a friend, in his capacity as a teacher of biology and botany, or as

a researcher in the taxonomy, ecology, and distribution of aquatic fungi. Much of that research was conducted at the University of Michigan Biological Station, University of Alaska, and Antarctica. Bob directed and completed degree programs for 13 Ph.D. students in Botany.

After retirement and during the last few years of his life, Bob Paterson frequently joined the retired biology faculty (OWLS) for their monthly lunches, many of the OWLS having been hired by him. We always enjoyed his sense of humor and company. The Department of Biological Sciences has established an endowment fund called The Robert and Marion Paterson Graduate Scholarship.

From Dr. Bruce Parker

Retiring

Jack Cranford (Associate Department Head)
 Joe Cowles (Associate Dean and Former Department Head)
 Asim Esen (Professor)
 Duncan Porter (Professor)

Promotions and Tenure

Jack Evans (Advanced Instructor)
 Mary Lipscomb (Senior Instructor)
 David Popham (Professor)
 Jill Sible (Associate Dean of the College of Science)

New Faculty Members

Daniel Capelluto (Assistant Professor, Cell Biology)
 Birgit Scharf (Assistant Professor, Microbiology)

New Postdoctoral Associates & Research Associates

Karen M. Eikenaar Bouwman (Hawley Lab)
 Cas Eikenaar (Moore Lab)
 Enma Veronica Espinosa (Li Lab)
 Sungbeom Lee (Tholl Lab)

New Staff

Sarah Davis (Lab Specialist, Li Lab)
 Melissa Cumbee (Administrative and Program Support)
 Laila Kirkpatrick (Lab Specialist, Hawley Lab)
 Katrina Lasley (Lab Specialist, Microbiology)
 Chiquita Thomas (Lab Specialist, General Biology)
 Nileshwari Vaghela (Lab Specialist, Sible Lab)
 Paul Youmans (Lab Specialist, Phillips Lab)



The OWLS, our **Older Wiser Learned Scientists**, have continuously met several times per semester to keep involved with university programs, and sustain the strong sense of community that characterizes our department. Shown in the picture are several members of the OWLS and current faculty at a lunch meeting held on December 12, 2007.

Front row left to right: Charles Rutherford, Bill Claus, Bob Paterson, Bob Jones, Bruce Parker.

Second row left to right: Al Heath, Curt Adkisson, Noel Krieg, Ernie Stout, Khidir Hilu, Bob Benoit and Al Hendricks.

UNDERGRADUATE RESEARCH

New Faces, New Ideas

By Hiba Mustafa

Andrew Lucas, a senior Biological Sciences and Chemistry double major, exemplifies how persistence and dedication as an undergraduate researcher lead to success. As a member of **Dr. Carla Finkielstein's** lab, his research focuses on protein ligand interactions and protein stability, and he is now working to publish his findings by co-authoring a paper titled "A Novel Heme-Regulatory Motif Mediates Heme-Dependent Degradation of the Circadian Factor Period." His dedication to his research has earned him well deserved recognition, including a Fralin Institute for the Life Sciences Fellowship and an invitation to present his findings at the prestigious ACC Meeting of the Minds conference in April 2008.

With advice from his advisor **Dr. Joe Cowles** and persistence in seeking opportunity, Lucas began volunteering in the Finkielstein lab during the spring semester of his freshman year, where he found himself an equally proactive and ambitious mentor. Impressed with his diligence, Finkielstein gave him the opportunity to begin his first project during his sophomore year. She says in her lab, "undergrads are not for washing dishes, they are for doing research!"

Finkielstein explains that after students master the general molecular biology techniques necessary to conduct research projects, working on individual projects allows them to increase their confidence and aptitude, while they make valuable contributions. Quite often, Finkielstein's undergraduate students undertake the riskiest projects and their work becomes the foundation for graduate students' studies.

"The beauty of working with undergrads is that they have no preset or biased notions. They propose ideas from a naïve point of view, which is important to keep science fresh in the lab," she explains.

For Lucas, undergraduate research has been a chance "to apply knowledge from the classroom to something physical." His involvement has been a continuous learning process. "I actually messed up my first experiment badly," he ironically recalls. However, by doing so he not only learned the value of the equipment and time put into



projects; he also learned the significance of asking questions in order for tasks to run smoothly.

"We need to go further in biology," says Lucas, who hopes to continue working on research as one of his future goals. Working in the Finkielstein lab has also helped him narrow down his future plans. Currently, he intends to complete a five year BS/MS program. Subsequently, he hopes to complete a combined Pharmacy and Ph.D. program pertaining to drug development and design.

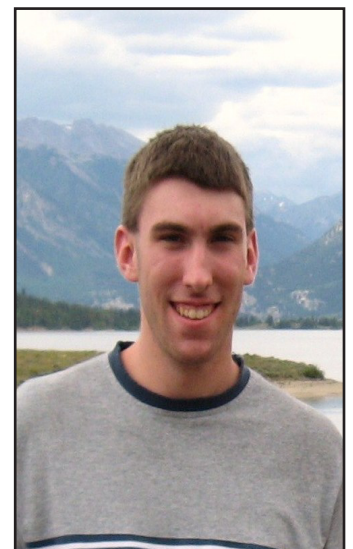
Finkielstein believes Lucas' complementary majors make him a well-rounded student, and she has high hopes for her mentee. "Andrew is a talented and very versatile student, who can work on pure cell biology to crystallography, from the atomic level to developmental biology, she says, "It is remarkable."

For more information on research in the Finkielstein Lab, visit <http://www.biol.vt.edu/faculty/finkielstein/index.htm>.

Daniel Deegan, a senior Biological Science major, says his research in **Dr. John McDowell's** lab (Department of Plant Pathology, Physiology, and Weed Science) has opened up further opportunities for him. This past summer, he was selected for a competitive National Science Foundation Research Experience for Undergraduates (REU) internship at Rutgers University in New Jersey, his home state.

During his internship, Deegan spent two weeks exploring the Pinelands. He then spent eight weeks conducting experiments under sterile conditions to determine if ectomycorrhizal fungi break down leaf litters to absorb nutrients or whether they absorb nutrients from the soil after decomposition by microorganisms. "Understanding the exact role of ectomycorrhizal fungi can lead to possible uses of the organism as a biofertilizer to increase absorption of nutrients by plants," he says.

Deegan's participation in the Rutgers University REU program has inspired him to pursue research opportunities in the future, during graduate school and afterwards as a career, and he believes the opportunity has also prepared him for such. At the completion of his internship, he created a professional poster and presented his findings. Deegan says, "The program allowed me to experience the process of collecting data and writing a professional paper. It has also enabled me to form skills in presenting data to colleagues and interacting with other scientists."



ALUMNI



“I have such fond memories of my very first year in the USA at Virginia Tech,” says **Dr. Lakhbir Singh**, an alumnus of the class of 1960. “Half a century ago when I landed on the campus of VT, I created a bit of excitement in Blacksburg because as a Sikh, I was wearing a turban and kids on the street were curious as to where I parked my elephant! I must have looked like a Maharaja!” Dr. Singh explains, “Having come from India with a

DVM, I enrolled in the graduate program towards a master’s degree in the fall of 1958 with a joint major in Bacteriology and Animal Sciences. I was given a teaching assistantship under Dr. Ed Moore who later became a leading authority in Anaerobic Bacteriology.” Dr. Singh also wants to share his respectful remembrances of Professors Dr. Walter Bernie Gross, Dr. Orcutt and Dr. I.D. Wilson who was a visiting FAO expert at the Indian Veterinary Research Institute (IVRI) 1957-58. “It was Dr. Wilson who encouraged me to apply to VT for graduate studies in the first place” says Dr. Singh. After receiving his Ph.D., from Kansas State University in 1963, Dr. Singh became Head of the Clinical Microbiology Department at St. Luke’s Hospital in Duluth, Minnesota (1964-67) and later at the Good Samaritan Hospital in Los Angeles, California (1967-93). He also held faculty positions at the University of Minnesota and UCLA. “Now I am retired, I travel, play golf and enjoy my six grandchildren. Currently I am living in Northridge, California, with my wife Manju” says Dr. Singh, who does wish to join the entire community of Blacksburg in their feeling of sadness due to that awful tragedy that occurred April 16, 2007. “May God bless the HOKIES!”

Dr. M. Catherine Aime is an Assistant Professor of Plant Pathology and Crop Physiology at Louisiana State University. She received all three of her Biology degrees from Virginia Tech; her B.S. in 1995, her M.S. in 1999, and her Ph.D. in 2001. She went on to serve as a Postdoctoral Associate at the University of Oxford (U.K.) until 2003, when she joined the USDA Agricultural Research Service as a Research Molecular Biologist; she started at LSU in 2007. She also currently serves as the Secretary of the Mycological Society of America and is an elected Fellow of the Explorers Club. Her research interests include the systematics, taxonomy, and evolution of rust fungi (*Pucciniales*) and their relatives, and the biodiversity of tropical *Basidiomycetes*. Over the past eight years, Dr. Aime has been involved in a study that has discovered over 1200 species of macrofungi (mushrooms) in six hundred square meters of rainforest in Guyana; more than 600 may be new to science. For more information her groundbreaking research, visit her website at http://www.lsu.edu/ppcp/faculty_staff/Aime/index.htm.



This February, **Dr. H. Scott Hurd** was named the Deputy Undersecretary of the Office of Food Safety and Inspection Service (FSIS) of the USDA. The FSIS conducts inspection over all meat and poultry harvest, processing, and imports. Dr. Hurd received his B.S. in Biology from Virginia Tech in 1978, where he also played as a defensive tackle on the football team; he went on to receive his DVM from Iowa State University in 1982, and his Ph.D. in Epidemiology from Michigan State in 1990. Before becoming Deputy Undersecretary, he worked with the USDA’s Agricultural Research Service and Animal Plant Health Inspection Service from 1989 to 2004, then served as an epidemiologist in the College of Veterinary Medicine of Iowa State from 2004 until 2007. His latest research interests include the epidemiology and food risks affecting human health, specializing in salmonella, campylobacter, and antibiotic risk assessments.



VT BioSPIRE Update

Fall 2008 marks first anniversary for the Virginia Tech Biological Sciences Strategic Partners in Research and Education. Merck, Novozymes Biologicals, PPD, and Revivacor have joined the organization; several other companies have been invited and are currently discussing articulation agreements. The third formal partners meeting, attended by representatives of partner corporations, faculty and students, was held September 8, 2008 at Virginia Tech’s new Life Sciences I building. Discussion began on a new NSF funded program (VT-STEM, obtained by **Drs. Jill Sible, Rich Walker and Daphne Rainey**) to recruit high quality students from diverse backgrounds into the Biological Sciences major. The partners agreed that valuable synergies could be captured by merging resources from VTBioSPIRE with those from VT-STEM. The partners also commented on Virginia Tech’s undergraduate Biotechnology option, which is currently being reviewed by faculty from several VT departments.

Another agenda item was to help define a vision for a new undergraduate research program that will provide capstone experiences for students and make them more competitive for jobs in industry. This vision has since become reality under the leadership of **Dr. Brent Opell** and a faculty team. A request for proposals has been released in anticipation of several \$500 awards to be made each semester, beginning in spring 2009. Successful student applicants will be asked to report and interpret research results, and present them as a talk or poster at a scientific meeting. The fall VTBioSPIRE meeting ended with a tour of VT’s Nanoscale Characterization and Fabrication Laboratory.

Destination: Portugal

In summer 2008, **Dr. Jack Webster** traveled to Coimbra, Portugal to attend the fifth conference of the Plant Litter Processing in Freshwater (PLPF) group at the University of Coimbra. Dr. Webster was on the scientific organizing committee for the meeting, and he chaired one session. He also presented a paper on nitrogen dynamics associated with decaying leaf litter. **Dr. Maury Valett** was a co-author on this paper. **Dr. Bruce Wallace**, a Virginia Tech Ph.D., was also a keynote speaker at the conference.



Founded in 1290, the University of Coimbra is one of the oldest universities in the world. Even though meetings were held in modern and well-equipped facilities, Dr. Webster also had the opportunity to visit some of the older and historic parts of the university. Dr. Webster renewed acquaintances with many scientists that he met at the second PLPF conference in Austria in 1999, and he also met many young researchers who are becoming the

leaders in Freshwater Ecology. Most conference attendees were from western Europe, but there were also several from eastern Europe, North America, quite a few from South America, and one from Japan. Many students from Portugal, Spain, France, and Brazil attended the meeting, and Dr. Webster was impressed by their competence and enthusiasm – and their ability to speak English.

GRANTS, PRESENTATIONS & AWARDS

Kwang-Hyung Kim, a Ph.D. student in Christopher Lawrence's lab has been awarded the College of Science's Roundtable Make-a-Difference Scholarship, which recognizes graduate students who make a significant difference to the college and the world outside of the university.

Erik Nilsen has been elected President of the College of Science Faculty Association.

George Simmons was voted as a Favorite Faculty Member 2008 by the Student Alumni Associates of the VT Alumni Association.

Zhaomin Yang was selected as a VT Scholar of the Week.

Jill Sible was awarded the 2008 University Alumni Teaching Award.

Dorothea Tholl received the 2007 Arthur C. Neish Young Investigator Award from the Phytochemical Society of North America.

John Tyson received the 2007 Aisenstadt Chair from the Centre de Recherches Mathématiques of the University of Montreal. The chair honors world-famous mathematicians and invites them to the university for a one-week to a one-semester stay. In addition, Dr. Tyson went to Merton College, Oxford, U.K., as a Visiting Research Fellow, where he continued his work with colleague Bela Novak.

Jeff Walters received a Recovery Leader Award from the U.S. Fish and Wildlife Services.

Mike Rozenzweig received the College of Science Outreach Award.

David Popham and **Jake Waller** each received Department of Biological Sciences Outstanding Service Awards; **Steve Melville** and **Ignacio Moore** each received Department of Biological Sciences Outstanding Teaching Awards.

Kathryn Harry (Melville Lab) was named the 2008 College of Sciences Outstanding Master's Student.

Art Buikema was selected as the Most Influential Professor of Biological Sciences by the Class of 2008; Jack Cranford was chosen as the Outstanding Undergraduate Advisor.

Muyao Shen, a Ph.D. candidate in Biological Sciences, has been named as a 2008 Doctoral Scholar for the Institute for Critical Technology and Applied Sciences. The program honors exceptional students through award of full financial support for the Ph.D. qualifying period.

Graduate Students **Alexandra Class** (Moore Lab), **Lu Gan** (Li Lab), **Erin Hewett** (Walters Lab), **Emily Lambert** (Popham Lab), and **Tongli Zhang** (Tyson Lab) each received Best Poster Awards at the Department's 2008 Research Day. **Jung-Hyun Huh** (Tholl Lab) and **Kristen Huntington** (Yang Lab) each received Honorable Mentions.

Michelle Barthet, a Ph.D. student in Khidir Hilu's lab, had a paper that was coauthored by her and Dr. Hilu, "Evaluating evolutionary constraint on the rapidly evolving gene matK using protein composition", featured on the February 2008 cover of the *Journal of Molecular Evolution*.

Graduate Student **Alexandra Class** (Moore Lab) and Postdoctoral Associate **Jianhua Yang** (Finkielstein Lab) were both awarded Sigma Xi Grants-in-Aid-of-Research. The program awards grants to outstanding students and postdocs from all areas of the sciences and engineering and is a national competitive award.

Graduate Student **Corrie Maxwell** (Stream Team) received a Karl Simpson Research Award for Applied Science from The North American Benthological Society, a competitive award which supports research in applied issues.

Graduate Student **Eric Sokol** (Stream Team) received the 2008 John Cairns, Jr. Graduate Fellowship.

Graduate Student **Martha Vaughan** (Tholl Lab) received the 2008 John Palmer Graduate Memorial Scholarship.

Graduate Student **Yu Chen** (McNabb Lab) received the Robert and Marion Paterson Graduate Fellowship.

Graduate Student **Damon Ely** (Stream Team) received the Mark Maly Graduate Fellowship.

Dipan Oza, an sophomore in Khidir Hilu's lab, received the Department of Biological Sciences Award for Outstanding Undergraduate Researcher. He is part of the collaborative Assembling Tree of Life Project.

Southern Appalachia on the Edge

We recently received word that the National Science Foundation has approved funding to continue the Coweeta Long Term Ecological Research (LTER) project. Biological Sciences faculty members **Fred Benfield**, **Maury Valett**, and **Jack Webster** are collaborating with more than twenty other ecological and social scientists from the universities of Georgia, Minnesota, North Carolina, Wisconsin, and Illinois, Duke University, Mars Hill College, and the US Forest Service in this interdisciplinary study. The research program is centered at the Coweeta Hydrologic Laboratory, a Forest Service research site since the 1930s and a part of the LTER program since its beginning in 1982. Over the next six years, the group will be conducting multi-scale process-oriented research on how the interaction between changing climate and land use influences the southern Appalachian socio-ecological system. The title of the project is Southern Appalachia on the Edge – Exurbanization & Climate Interaction in the Southeast.

The Coweeta LTER is part of a network of 26 sites ranging from the north slope of Alaska to Antarctica and involving more than 1800 scientists. Webster has been working at this research site since 1971, and Benfield has been involved with Coweeta research since about 1980. Valett is new to the Coweeta LTER project but has been involved with several other projects at the site.



Dramatic growth of the urban centers surrounding the southern Appalachian Mountains is expected to impact the ecological and social-economic processes in the rural areas of southern Appalachia. Many streams at Coweeta have been gauged for over 70 years. The long-term record of research on these streams and their watersheds provides the essential background for extensive studies of the combined effects of urban growth and climate change on these diverse and valuable ecosystems.

Say hello to the future.



Meet Jeff Walters, the Harold Bailey Professor of Biology at Virginia Tech, and one of the nation's best-known and most respected scientists in the field of conservation biology. Walters' efforts to protect rare and endangered species of birds – including the red-cockaded woodpecker and the Laysan duck – have taken him around the world, and helped preserve these species for future generations.

When you support the Department of Biological Sciences at Virginia Tech, you are inventing the future. You are creating the next generation of scholars, men and women like Jeff Walters, who will find ways to preserve our past as they invent the future.

Find out how you can invent the future. Contact us today.

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